CLAIMS

What is claimed is:

1. A method of forming an ablative structure, the method comprising the steps of:

(a) applying a first quantity of a low temperature ablative material to a substrate;

(b) mixing an intumescent material with a second quantity of low temperature ablative material; and

(c) applying the intumescent material mixed with the second quantity of low temperature ablative material over the first quantity of low temperature ablative material.

2. The method of Claim 1, wherein the low temperature ablative material and the intumescent material are applied to the substrate using spray forming.

3. The method of Claim 2, wherein the intumescent material mixed with the quantities of low temperature ablative material is between approximately 0.05 and 0.75 inches thick.

4. The method of Claim 3, wherein the intumescent material mixed with the quantities of low temperature ablative material is approximately 0.25 inches thick.

5. The method of Claim 1, wherein the intumescent material is mixed between approximately 10 and 50 percent by weight with the low temperature ablative material.

6. The method of Claim 5, wherein the intumescent material is mixed between approximately 25 and 40 percent by weight with the low temperature ablative material.

7. The method of Claim 1 further comprising the step of curing the low temperature ablative material and the intumescent material onto the substrate.

8. The method of Claim 7, wherein the low temperature ablative material and the intumescent material are cured at room temperature.

9. The method of Claim 8, wherein the low temperature ablative material and the intumescent material are cured onto the substrate between approximately 10 minutes and 24 hours.

10. The method of Claim 9, wherein the low temperature ablative material and the intumescent material are cured onto the substrate between approximately one and 4 hours.

11. The method of Claim 1, wherein the intumescent material is ammonium polyphosphate.

12. The method of Claim 1, wherein the low temperature ablative material is cork-based.

13. A method of forming an ablative structure, the method comprising the steps of:

(a) applying a first quantity of low temperature ablative material to a substrate;

(b) mixing a first quantity of intumescent material with a second quantity of low temperature ablative material;

(b) applying the first quantity of intumescent material mixed with the second quantity of low temperature ablative to the substrate on top of the first quantity of low temperature ablative material;

(c) mixing further quantities of intumescent material with further quantities of low temperature ablative material; and

(d) applying the further quantities of intumescent material mixed with the further quantities of low temperature ablative material to the substrate on top of the first quantity of intumescent material mixed with the second quantity of low temperature ablative material,

wherein the further quantities of low temperature ablative material are successively less than the second quantity of low temperature ablative material, such that the intumescent material is applied in an increasing amounts, thereby forming a gradient of intumescent material.

14. The method of Claim 13, wherein the quantities of low temperature ablative material and the quantities of intumescent material are applied to the substrate using spray forming.

15. The method of Claim 14, wherein the quantities of intumescent material mixed with the quantities of low temperature ablative material is between approximately 0.05 and 0.75 inches thick.

16. The method of Claim 15, wherein the quantities of intumescent material mixed with the quantities of low temperature ablative material is approximately 0.25 inches thick.

17. The method of Claim 13, wherein the intumescent material is mixed between approximately 10 and 50 percent by weight with the low temperature ablative material.

18. The method of Claim 17, wherein the intumescent material is mixed between approximately 25 and 40 percent by weight with the low temperature ablative material.

19. The method of Claim 13 further comprising the step of curing the low temperature ablative material and the intumescent material onto the substrate.

20. The method of Claim 19, wherein the low temperature ablative material and the intumescent material are cured at room temperature.

21. The method of Claim 20, wherein the low temperature ablative material and the intumescent material are cured onto the substrate between approximately 10 minutes and 24 hours.

22. The method of Claim 21, wherein the low temperature ablative material and the intumescent material are cured onto the substrate between approximately one and 4 hours.

23. The method of Claim 13, wherein the intumescent material is ammonium polyphosphate.

24. The method of Claim 13, wherein the low temperature ablative material is cork-based.

25. An ablative structure comprising:

a substrate;

a low temperature ablative material applied to the substrate to form an outer surface of the ablative structure; and

an intumescent material disposed within the low temperature ablative material at the outer surface of the ablative structure.

26. The ablative structure of Claim 25, wherein the intumescent material is disposed within the low temperature ablative material in increasing amounts towards the outer surface of the ablative structure, thereby forming a gradient of intumescent material.

27. The ablative structure of Claim 25, wherein the intumescent material is between approximately 10 and 50 percent by weight with the low temperature ablative material.

28. The ablative structure of Claim 27, wherein the intumescent material is between approximately 25 and 30 percent by weight with the low temperature ablative material.

29. The ablative structure of Claim 25, wherein the low temperature ablative material and the intumescent material have a thickness between approximately 0.05 and 0.75 inches.

30. The ablative structure of Claim 29, wherein the low temperature ablative material and the intumescent material have a thickness of approximately 0.25 inches.

31. The ablative structure of Claim 25, wherein the intumescent material is ammonium polyphosphate.

32. The ablative structure of Claim 25, wherein the low temperature ablative material is cork-based.

33. The ablative structure of Claim 32, wherein the cork-based low temperature ablative material further comprises epoxy.

34. An ablative composition comprising:

approximately 50-90 percent by weight of a low temperature ablative material; and

approximately 10-50 percent by weight of an intumescent material disposed within the low temperature ablative material.

35. The ablative composition of Claim 34, wherein the percent by weight of intumescent material is between approximately 25 and 30 percent.

36. The ablative composition of Claim 34, wherein the intumescent material is disposed within the low temperature ablative material in increasing amounts through the ablative composition, thereby forming a gradient of intumescent material.

37. The ablative composition of Claim 34, wherein the intumescent material is ammonium polyphosphate.

38. The ablative composition of Claim 34, wherein the low temperature ablative material is cork-based.

39. The ablative composition of Claim 38, wherein the cork-based low temperature ablative material further comprises epoxy.

40. A method of forming an ablative structure, the method comprising the steps of:

(a) mixing a quantity of intumescent material with a low temperature ablative material; and

(b) applying the quantity of intumescent material mixed with the low temperature ablative material to a substrate.

41. The method of Claim 40, wherein the intumescent material is disposed within the low temperature ablative material in increasing amounts towards an outer surface of the ablative structure, thereby forming a gradient of intumescent material.